

DIAGNOSTICS

Should we consider alternatives to combined cervical and urethral swabs for detection of *Chlamydia trachomatis* in females?

M Mahto, H Mallinson

Sex Transm Infect 2007;**83**:335–336. doi: 10.1136/sti.2006.024661

Background: The optimum approach for detecting *Chlamydia trachomatis* (CT) is considered to be combined cervical and urethral testing.

Objective: To assess the contribution of female urethral swabs in CT diagnosis and to examine alternatives.

Method: Urethral and endocervical samples for CT were performed on 757 sexually active female patients, >16 years, attending the genitourinary medicine clinic at Macclesfield District General Hospital from October 2005 to November 2006. Swabs were collected and transported to the laboratory in separate AC2 sample collection tubes and were tested by AC2 assay.

Results: Of the 757 patients tested simultaneously by both endocervical and urethral swab, a total of 90 had CT identified by either method giving a positivity rate of 11.9%. Results for urethral and endocervical swabs were concordant in 77 patients (85.6%). Eighty two infections (91.1%) would have been diagnosed by swabbing the cervix only but an additional 8 (8.9%) were picked up by urethral swab. Urethral symptoms had been mentioned by 1 of these 8 women.

Conclusion: 8.9% infected women were positive only on urethral swab. One of these would have been picked up owing to presenting symptoms, hence reducing the extra yield to 7.8% and leaving only 7 positives on 757 urethral swabs with a detection rate of 1% of all urethral swabs. Considering the low yield and the discomfort of urethral swabbing, an additional urethral swab appears unwarranted on grounds of both cost and patient care. As a small number of cases were detected at the urethra but not the cervix, it may be worthwhile investigating the performance of AC2 when placing an endocervical swab in first catch urine. An effective and simpler approach may be a switch to testing vaginal swabs by AC2.

The optimum approach for detecting *Chlamydia trachomatis* (CT) in a genitourinary medicine (GUM) setting has been combined cervical and urethral testing. The endocervix has been the preferred anatomic site for specimen collection, although it has been claimed that 10–23% of females will only be infected in the urethra.^{1,2} Various studies have quoted an increase of 5–33% in detection of CT with inclusion of a urethral swab.^{2–5} However these studies used insensitive detection methods such as cell culture or enzyme immunoassay.

We currently use the highly sensitive Aptima Combo 2 assay (AC2; Gen-Probe, San Diego, CA, USA) to detect CT by both urethral and cervical swabs in female patients. Given the fact that urethral swabbing is painful we wanted to ascertain its contribution in detecting chlamydia before we changed our practice. There has been no study to date looking at the contribution of a urethral swab in females tested by AC2.

METHOD

Urethral and endocervical sampling for chlamydia were performed routinely on all sexually active female patients aged 16 and over within the GUM Department at Macclesfield District General Hospital from October 2005 to November 2006.

Swabs were collected and transported to the laboratory in separate AC2 sample collection tubes and were tested by AC2 assay.

RESULTS

Of the 757 patients tested by both endocervical and urethral swab, 90 had CT identified by either method giving a positivity rate of 11.9% (table 1).

Of the 90 positives, results for urethral and endocervical swabs were concordant in 77 patients (85.6%). Eighty two infections (91.1%) would have been diagnosed by swabbing cervix alone but an additional 8 (8.9%) were picked up by the urethral swab. Urethral symptoms had been mentioned by 1 of these 8 women. The improved detection rate was not statistically significant (OR 1.11, 95% CI 0.80 to 1.54).

DISCUSSION

Our 8.9% (8 of 90) of patients with positive AC2 results only from the urethra is somewhat lower than other studies^{1,2} but still indicates that testing from one site alone—the cervix or urethra—may not be optimal. In our study, one woman could have been picked up on presenting urethral symptoms, hence reducing the extra yield to 7.8%.

Thus from 757 urethral swabs taken, the additional yield of 7 represents a detection rate of only 1%. A similar study⁶ found that taking an additional urethral swab, and using the ligase chain reaction assay, increased positives by 6% (reduced to 4.4% if urethral swabs were taken only on patients with urethral symptoms).

Routinely performing a urethral swab along with a cervical swab, together with the AC2 assay leads to only a small (1%) increase in detection rate. This has to be weighed up against increased economic cost of extra resources and discomfort to every patient. What alternatives do we have? A tactic of testing an endocervical swab transported in a specimen of (non-

Table 1 Test results of 757 patients

	Cervical swab positive	Cervical swab negative
Urethral swab positive	77	8
Urethral swab negative	5	667

Abbreviations: AC2, Aptima Combo 2; CT, *Chlamydia trachomatis*; CVS, clinician collected vaginal swab; FCU, first catch urine; PVS, patient collected vaginal swab

Key messages

- Chlamydia testing from one site (cervix or urethra alone) may not be optimal.
- An additional urethral swab appears unwarranted on grounds of both cost and patient care.
- An effective and simpler approach may be to test vaginal swabs by AC2.

invasive) urine has previously been tried.⁷⁻⁸ We are not aware of any studies using AC2 to test combined first catch urine (FCU) plus an endocervical swab. Another alternative, with the added advantage of not requiring a speculum investigation, could be to use vaginal swabs. Chernesky *et al*⁹ found when using AC2 that of 180 positive CT cases (both symptomatic and asymptomatic), 172 (95.5%) were identified on a patient collected vaginal swab (PVS), 174 (96.6%) on a clinician collected vaginal swab (CVS), 165 on FCU (91.6%) and 172 on a clinician collected cervical swab. They also noted that the majority of women found PVS easy and preferred it to FCU or having a pelvic examination to collect an endocervical swab. Schachter *et al*¹⁰ suggest that vaginal swab specimens probably combine material from two potential sites of infection: urine or discharge coming from the urethra and discharge from the endocervix, thus leading to a higher detection rate than FCU or endocervical swabs alone. Using the ligase chain reaction assay, Shafer *et al*¹¹ found that testing multiple types of specimen increased the positive yield markedly. However their increased yield from cervical swab plus urine over cervical swab alone (176/205 vs 134/207) was almost matched by vaginal swab alone (167/207). Indeed the proposal to swab the vaginal introitus may perhaps maximise the combined pick up from these two areas.¹²

We have also noticed that in the clinical trial data for AC2 (package insert IN0037-03 Rev A, Table 6b (available at <http://www.gen-probe.com/pdfs/pi/501011RevA.pdf>)) 16 patients were described where a cervical swab was negative and FCU was positive. Although missed by cervical testing a vaginal swab found most of these cases—14 (95% CI 9.9 to 15.1) of 16 by PVS and 12 (95% CI 7.7 to 14.9) of 16 by CVS.

Vaginal swabs tested by AC2 do not show the problems associated with control of inhibitors of amplification that have been encountered with other test platforms.¹³⁻¹⁴

CONCLUSION

Considering only the low yield (only 1%) and the discomfort of urethral swabbing, an additional urethral swab appears unwarranted on grounds of both cost and patient care. However as a small number of cases were detected at the urethra but not the cervix, it may be worthwhile investigating the performance of AC2 when placing an endocervical swab in FCU. An effective and simpler approach may be a switch to testing vaginal swabs by AC2.

ACKNOWLEDGEMENTS

We thank Andre Charlett and Tom Nichols both of the Health Protection Agency, Centre for Infections, Colindale, London for their statistical input.

AUTHOR CONTRIBUTIONS

MM conceived the idea for the paper, did the literature search and wrote the initial draft of the manuscript. HM provided *Chlamydia trachomatis* results on all patients and helped with data interpretation and contributed to the manuscript.

Authors' affiliations

M Mahto, Genitourinary Medicine Department, Macclesfield District General Hospital, Macclesfield, UK

H Mallinson, Clinical Microbiology and Health Protection Agency Collaborating Laboratory, University Hospital Aintree, Liverpool, UK

Competing interests: None.

This study was presented as a poster at the BASHH conference in Blackpool 2–4th May 2007, poster no 47 and published as an abstract (*Int J STD AIDS* 2007;**18**(Suppl 1):21).

Correspondence to: Dr M Mahto, GUM department, Macclesfield District General Hospital, Victoria Road, Macclesfield SK10 3BL, UK; mrinalini.mahto@echeshire-tr.nwest.nhs.uk

Accepted for publication 26 June 2007

Published Online First 4 July 2007

REFERENCES

- 1 Buimer M, Van doornum GJJ, Ching S, *et al*. Detection of *Chlamydia trachomatis* and *Neisseria gonorrhoeae* by ligase chain reaction-based assays with clinical specimen from various sites: implications for diagnostic testing and screening. *J Clin Microbiol* 1996;**34**:2395–400.
- 2 Jones RB, Katz BP, Van der Pol B, *et al*. Effect of blind passage and multiple sampling on recovery of *Chlamydia trachomatis* from urogenital specimens. *J Clin Microbiol* 1986;**24**:1029–33.
- 3 Johannisson G, Lowhagen GB, Lycke E. Genital chlamydia trachomatis infection in women. *Obstet Gynaecol* 1980;**56**:671–5.
- 4 Wallin JE, Thompson SE, *et al*. Urethritis in women attending an STD clinic. *Br J Vener Dis* 1981;**57**:50–4.
- 5 Bradley MG, Hobson D, Lee N, *et al*. Chlamydia infections of the urethra in women. *Genitourinary Medicine* 1985;**61**:371–5.
- 6 Gupta M, Dinardo LRB, Mallinson H, *et al*. Chlamydia trachomatis detection in women: is the urethral swab a tool of the past? Final Program and Abstracts, 8th World STI/AIDS Congress 2003, abstract, **344**:290.
- 7 Airell A, Ottosson L, *et al*. Chlamydia trachomatis PCR (Cobas Amplicor) in women: endocervical specimen transported in a specimen of urine versus endocervical and urethral specimens in 2-SP medium versus urine specimen only. *Int J STD AIDS* 2000;**11**:651–8.
- 8 Chan EL, Brandt K, Stoneham H, *et al*. Comparison of the effectiveness of polymerase chain reaction and Enzyme Immuno Assay in detecting *Chlamydia trachomatis* in different female genitourinary specimens. *Arch Pathol Lab Med* 2000;**124**:840–3.
- 9 Chernesky M, Lane JR, Martin DH, *et al*. Women prefer self-collection of vaginal swabs which are as effective for the diagnosis of *Chlamydia trachomatis* and *Neisseria gonorrhoeae* as urine, cervical swabs and clinician collected vaginal swabs. 104th General Meeting of the American Society for Microbiology 2004, abstract C-284.
- 10 Schachter J, Chernesky MA, Willis DE, *et al*. Vaginal swabs are the specimens of choice when screening for *Chlamydia trachomatis* and *Neisseria gonorrhoeae*: results of a multicentre evaluation of the Aptima assays for both infections. *Sexually Transmitted Diseases* 2005;**32**:725–8.
- 11 Shafer M-A, Moncada J, Boyer CB, *et al*. Comparing first-void urine specimens, self-collected vaginal swabs, and endocervical specimens to detect *Chlamydia trachomatis* and *Neisseria gonorrhoeae* by a nucleic acid amplification test. *J Clin Microbiol* 2003;**41**:4395–9.
- 12 Wiesenfeld HC, Heine RP, Rideout A, *et al*. The vaginal introitus: a novel site for *Chlamydia trachomatis* testing in women. *Am J Obstet Gynecol* 1996;**174**:1542–6.
- 13 Chernesky M, Jang D, Luinstra K, *et al*. High analytical sensitivity and low rates of inhibition may contribute to detection of *Chlamydia trachomatis* in significantly more women by the APTIMA Combo2 assay. *J Clin Microbiol* 2006;**44**:400–5.
- 14 Cosentino LA, Landers DV, Hillier SL. Detection of *Chlamydia trachomatis* and *Neisseria gonorrhoeae* by strand displacement amplification and relevance of the amplification control for use with vaginal swab specimens. *J Clin Microbiol* 2003;**41**:3592–6.